DOI: 10.5114/aic.2016.63645

Abstracts of original contributions

17th Interventional Cardiology Workshop New Frontiers in Interventional Cardiology

December 8th, 2016, Krakow, Poland

1-P

Benefits in bleeding rates and periprocedural mortality of radial approach in ST-segment elevation myocardial infarction. Propensity score analysis of data from ORPKI Polish National Registry

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Background: The utilization of the radial access (RA) for percutaneous coronary intervention (PCI) has gradually increased. Recent studies suggest an advantage over femoral access (FA) in high-risk patients presenting with ST-segment elevation myocardial infarction (STEMI). The aim was to evaluate bleeding complications and periprocedural outcomes with safety and efficacy of RA compared with FA for PCI with stent implantation in "real-world" patients with STEMI presentation from Polish National Registry.

Methods: The study group consisted of 22,812 consecutive patients with STEMI treated with PCI and stent implantation between January 2014 and June 2015 in 151 tertiary invasive cardiology centers in Poland. All data were stored in electronic database of National PCI Registry (ORPKI). Patients treated with RA and FA were compared using a propensity score analysis to best match between groups. The analysis was done in the "as-treated" manner.

Results: Femoral access and RA were used in 9,334 (40.9%) and 13,478 (59.1%) patients, respectively. After propensity score matching no differences in baseline characteristic between 6,542 matched pairs was found. Significantly higher total amount of contrast (191.8 ±8 ml vs. 174.8 ±68.8 ml, $p = 0.0001$) and lower radiation doses were used in FA (1279.5 ±1346.3 mGy vs. 1182.6 ±887 mGy, $p = 0.02$). More bleeding complications at puncture site after both angiography (0.17% vs. 0.02%; $p = 0.004$) and PCI (0.23% vs. 0.09%, $p = 0.049$) were reported in FA group. Periprocedural death (1.94% vs. 0.93%, $p = 0.0001$) and periprocedural cardiac arrest (1.44% vs. 0.96%, $p = 0.01$) occurred significantly more often after PCI performed with FA.

Conclusions: Radial access was associated with lower incidence of periprocedural death in STEMI patients as well as a significant reduction of bleeding complications at access site.

2-P

Psoriasis is associated with increased risk of allergic reaction during percutaneous interventional cardiology procedures. Data from the Polish National PCI Registry

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Background: Little is known on the impact of psoriasis on the outcome of percutaneous cardiovascular procedures. The aim of this analysis was to identify the incidence of active psoriasis, baseline characteristic, and periprocedural to in-hospital outcomes in this subgroup of patients.

Methods: The Polish National PCI database (ORPKI) is a mandatory registry for all percutaneous cardiology procedures performed in Poland since 2004. All consecutive patients who had coronary angiography or coronary angiography with immediate PCI in 155 interventional cardiology centers in Poland in 2014 for either stable angina or acute coronary syndrome were included. Patients with active psoriasis on admission were identified. Allergic origin of the periprocedural complication was defined if a typical reaction from rash to anaphylaxis was diagnosed.

Results: There were 206,335 patients with complete records in the database. Active psoriasis was diagnosed in 830 of them (0.4%). Patients with psoriasis were younger (63.1 ±10.6 years vs. 66.2 ±10.9 years, $p < 0.01$), significantly more often with diabetes mellitus, arterial hypertension and chronic kidney disease. The periprocedural mortality for patients with psoriasis (0.77%) was similar to those without (0.55%; $p = 0.6$). Interestingly, allergic reaction occurrence during angiography was 0.77% in patients with psoriasis vs. 0.07% in patients without psoriasis ($p < 0.001$). In multivariate regression analysis, the diagnosis of active psoriasis was an independent predictor of the occurrence of an allergic reaction during coronary angiography/PCI with OR = 8.3 and 95% CI: 1.98–34.93 ($p = 0.004$).

Conclusions: Psoriasis is associated with a different patient baseline profile and an increased risk for allergic reaction occurrence during the procedure. Best to our knowledge, this is the first report of such relationship and requires further study.

3-P

Characterization of restenotic tissue depending on the prevalence of neovascularization evaluated by optical coherence tomography in porcine artery model

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Background: Neovascularization in restenotic tissue may play a key role in neointimal proliferation and progression of neoatherosclerosis. There are still insufficient *in vivo* data regarding in-stent neovascularization.

Methods: We evaluated 48 stent segments from 24 stents implanted in porcine model of coronary artery injury. Optical coherence tomography (OCT) was performed 90 days post implantation. All measurements and qualitative analysis were performed by two independent investigators. Microvessels were defined as well delineated low backscattering structures with diameter less than 200 microns that show a trajectory within the vessel. There were two groups: with (1) or without (2) occurrence of neovascularization. Optical coherence tomography findings were compared between both groups.

Results: There were no statistically significant differences between the two groups, but lesions with microvessels had a larger average stent area (8.83 ±1.39 vs. 8.27 ±1.36, p = NS) and larger average neointimal area (2.62 ±1.46 vs. 1.95 ±0.87, p = NS) than those without microvessels. Minimal lumen cross-sectional area (CSA) were almost identical in both groups (2.56 ±0.47 vs. 2.57 ±0.33, p = NS).

Conclusions: Occurrence of neovascularization might be associated with the extent of neointimal area, but further studies are required to estimate factors associated with strut neovascularization.

4-P

Plaque redistribution after stenting – data from NIRS-IVUS imaging

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Background: The previous study using intravascular imaging presented that the part of the treated atheroma is squeezed out of the vessel by the stent and its remnants may embolize. The present study aimed to characterize the plaque redistribution with relation to its composition.

Methods: The combined near-infrared spectroscopy (NIRS) and intravascular ultrasound (IVUS) imaging analyzed the plaque distribution after the stent implantation *in vivo* in patients with a stable coronary artery disease (CAD) (n = 33) and acute coronary syndromes (n = 16). Near-infrared spectroscopy detected lipids in the lesion and IVUS presented the redistribution of the plaque. The maximal lipid core burden index in a 4 mm long segment (LCBI4mm) was estimated by NIRS before and after the stent implantation, and IVUS estimated minimal lumen area (MLA), plaque burden (PB) and plaque volume pre and post implantation.

Results: NIRS-IVUS imaging was performed before and after the implantation of 50 stents in 49 patients. The median plaque volume pre and post implantation was 127.45 (74.5, 186.8) mm^2 vs. 99.35 (67.5, 171.5) mm^2 (p < 0.001) with a median difference 19.25 (3.9, 72) mm^2. The median LCBI4mm pre and post stent was 351 (157, 589) vs. 77 (3, 231) (p < 0.001) in the treated lesions, and 34 (0, 207) vs. 0 (0, 45) (p < 0.04) in segment 4 mm long proximally to the stent. Plaque burden in 4 mm proximally to the implanted stent increased from 46.23 ±11.79 to 50.36 ±9.93 post stenting (p = 0.02). The difference in the plaque volume pre and post stenting correlated with the value of LCBI4max of the treated lesion (r = 0.457, p = 0.001). The median difference in the plaque volume was higher for stented lesions with LCBI 4mm > 265 (8.2 (1.4, 19.3) vs. 24.3 (12.1, 45.0), p = 0.012) (Figure 1).

Conclusions: Lipid-rich lesions characterized greater release of the atheroma remnants to the coronary artery lumen as compared to non-lipid rich lesions. The stent

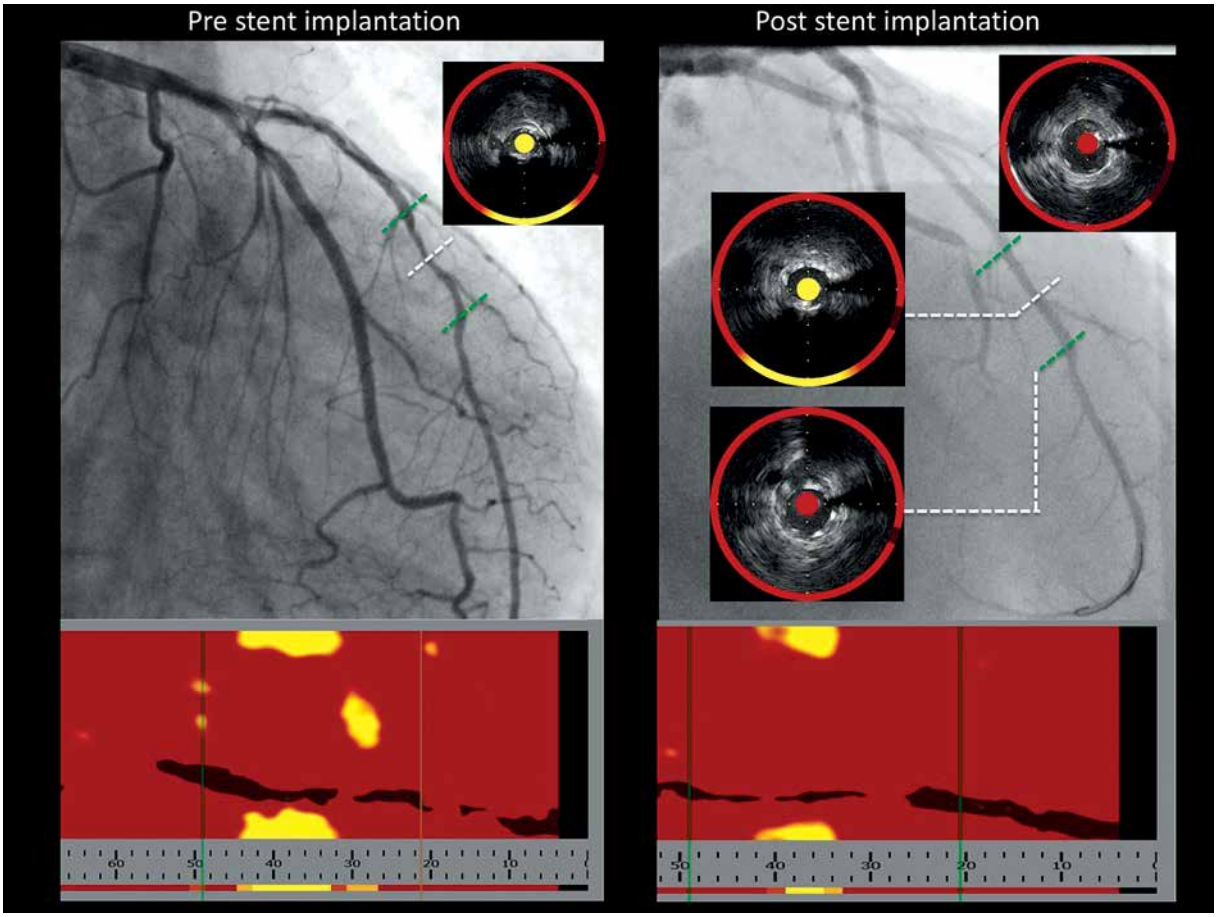

Figure 1. Case example of the combined near-infrared spectroscopy and intravascular ultrasound imaging

implantation causes plaque shift proximally to the implanted stent.

5-P

Intravenous versus intracoronary administration of adenosine for assessment of coronary fractional flow reserve

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Background: Adenosine is commonly used to induce maximal hyperemia to evaluate the hemodynamic significance of coronary stenoses with measuring fractional flow reserve (FFR). So far, limited number of studies validated the intracoronary application of adenosine against standard intravenous infusion. Thus, we aimed to assess agreement and reproducibility of FFR measurements during intracoronary vs. intravenous administration of adenosine.

Methods: Consecutive patients with angiographically borderline coronary lesions (40–90%) diameter stenosis in visual assessment), who were scheduled for FFR were enrolled. Patients received intravenous adenosine infusion via a 6-F femoral venous sheath. Adenosine was administered at 140 at 280 µg/kg/min. Intracoronary adenosine bolus injection was performed with 100 µg, 200 µg, 400 µg and 600 µg.

Results: Femoral vein adenosine at 140 and 280 µg/kg/min as well as intracoronary boluses recordings from 81 vessels in 32 patients were suitable for blinded analysis. The median FFR measured using adenosine administered via femoral routes at 140 µg/kg/min was 0.82 (IQR: 0.76–0.89) and at 280 µg/kg/min – 0.82 (IQR: 0.75–0.88), p = 0.001. However, a strong correlation between them was found r = 0.99. Median FFR values for 100 µg, 200 µg, 400 µg and 600 µg bolus were: 0.84, 0.83, 0.83 and 0.83, respectively. We found numerically higher values of FFR assessed with boluses comparing to infusion with the mean difference of FFR from 0.01 (bolus 600 µg) to 0.02 (bolus 100 µg). We did not find any differences

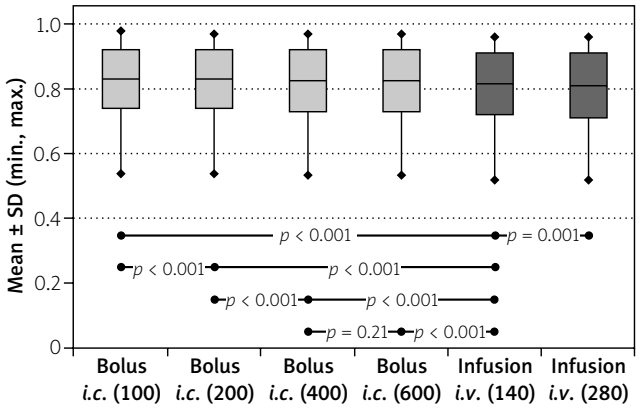

Figure 1. Mean values of fractional flow reserve assessed with adenosine *i.c.* boluses and *i.v.* infusion

between 400 and 600 µg bolus (p = 0.21). Differences between boluses and infusion are shown in details on Figure 1.

Conclusions: Values of FFR achieved with adenosine infusion via femoral vein and with intracoronary boluses are consistent. However, there seems to be a grey zone for FFR assessed with boluses which may indicate, in selected cases, the use of femoral vein infusion to confirm the results.

6-P

Long-term outcomes of patients undergoing rotational atherectomy due to failed percutaneous coronary intervention depend on the reason of primary intervention failure

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Background: Rotational atherectomy (RA) is often used as a bailout technique after unsuccessful percutaneous coronary intervention (PCI). This study was created to evaluate outcomes of patients undergoing RA depending on reason of previous PCI failure.

Methods: We retrospectively evaluated data of 210 consecutive patients undergoing RA in our tertiary center. From our analysis we excluded patients undergoing RA without previous PCI attempt (n = 42), those referred from other centers without description of PCI failure cause (n = 10) or lacking complete clinical data (n = 6). Remaining patients (n = 152) were divided into two groups: those with uncrossable (32%) or undilatable lesions (68%). Follow-up data concerning death from any cause was acquired from the Polish National Health Found.

Results: Patients with uncrossable lesions were older (72 vs. 69 years; p = 0.03) and more often suffered from stroke or transient ischemic attack in anamnesis (20% vs. 8%, p = 0.04). The groups did not differ in any other clinical characteristics. We also did not show any differences in procedure characteristics, success and complications rates or in-hospital adverse events. Patients with uncrossable lesions had higher all-cause mortality after 1 year (18% vs. 8%; p = 0.05), 2 years (24% vs. 10%; p = 0.02) and 3 years (29% vs. 14%; p = 0.03). Multivariate Cox regression model showed uncrossable coronary lesions to be an independent predicting factor of all-cause mortality 2 years after procedure (HR = 2.8; 95% CI: 1.13–7.15; p = 0.03).

Conclusions: Patients undergoing RA after failed PCI due to uncrossable lesions have poorer long term prognosis. Further studies evaluating causes of higher mortality in this population are needed.

7-P

Severe calcifications in target lesions of patients with acute myocardial infarction undergoing percutaneous coronary intervention predict adverse cardiac events in long-term follow-up

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Background: This study was created to assess the frequency and influence of severe coronary artery calcification (CAC) in target lesions on adverse cardiac events in patients undergoing percutaneous coronary interventions (PCI) due to acute myocardial infarction.

Methods: We prospectively evaluated data of 206 consecutive patients who underwent PCI due to acute myocardial infarction. The pre-specified angiographic definition of severe calcifications was the presence of radiopaque densities visible without heart motion and affecting both sides of the treated lesion. Follow-up data concerning primary end points was acquired from the Polish National Health Found.

Results: Severe CAC in target lesions were present in 35 (17%) patients. These patients were older (71 vs. 65

years, p = 0.02), were more often diagnosed with non-ST elevation myocardial infarction (NSTEMI, 77% vs. 58%, p = 0.03) and had higher levels of NT-proBNP at admission (2006 pg/ml vs. 745 pg/ml, p = 0.01). Full revascularization during index procedure was achieved less often in patients with severe CAC (14% vs. 41%, p = 0.003). During 30 months of follow-up patients with severe CAC more often suffered from another ACS (37% vs. 13%, p = 0.0005) and had higher all-cause mortality (31% vs. 16%, p = 0.04). Multivariate Cox regression model showed severe CAC in target lesions to be the only independent predicting factor of another ACS in studied population (hazard ratio = 2.78; 95% confidence interval: 1.39–5.56; p = 0.004).

Conclusions: In everyday practice, almost every sixth patient with myocardial infarction has severe CAC in target lesions. This group has poorer prognosis then the rest of the population. Presence of severe CAC in target lesions independently predicts recurrent ACS.

8-P

Early and one-year clinical outcomes of patients with heavily calcified coronary artery lesions presenting with acute coronary syndromes treated with rotational atherectomy

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Background: Rotational atherectomy (RA) is s method of treatment of highly calcified lesions that cannot be treated with traditional percutaneous coronary intervention (PCI). However, RA in patients with acute coronary syndromes (ACS) remains controversial and may be contraindicated.

Methods: The study included 207 consecutive patients, who underwent RA. A retrospective analysis of data in subjects presenting with ACS (n = 42) or treated electively (n = 165) was done.

Results: Patients presenting with ACS were older, had higher systolic blood pressure and heart rate on admission, they were less likely to undergo PCI before and had lower total left ventricular ejection fraction (LVEF). Estimated risk and lesion complexity were higher in the ACS population. We found no differences in procedural aspects. We noted higher rates of contrast-induced nephropathy and bleeding in the ACS group. During in-hospital observation 2 cases of death occurred in the ACS group, but we found no difference in total mortality, ACS, decompensated HF or stroke rates in 1-year follow-up. Analysis of Cox hazard risk model revealed PCI failure due to uncrossable lesion to be risk factor of total 1-year mortality in the whole studied group; increasing LVEF improved the prognosis. Detailed data are presented in the Table I (see page 396).

Conclusions: One-fifth of RA candidates present with ACS. Despite higher periprocedural mortality rate in ACS group, we found no significant difference in 1-year outcomes in comparison with elective patients. Rotational atherectomy in patients with ACS in experienced centre should be considered in that particular setting if no other options of treatment exist.

9-P

Risk assessment of premature discontinuation of dual antiplatelet therapy in patients undergoing vascular surgery after second generation DES implantation

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Background: Some patients receiving dual antiplatelet therapy after percutaneous coronary interventions (PCI) with drug-eluting stent (DES) implantation require surgery to be performed during dual antiplatelet therapy (DAPT) administration period. Aim of our research was to assess the risk of premature discontinuation of DAPT after PCI with second generation DES implantation in patients undergoing major vascular surgeries.

Methods: Our study group consist of 88 patients who underwent PCI with second generation DES implantation between 2010 and 2014 and underwent major vascular surgery up to 12 months after PCI, requiring discontinuation of DAPT in perioperative period. We assessed the frequency of death, myocardial infarction (MI), major bleeding episodes and other adverse events in short and long-term observation.

Results: Patient characteristics are shown in Table I (see page 397). In perioperative period, we reported no MI, death, or major bleeding. During the follow up period of mean 2.71 (0.16–5.75) years, we recorded 14 (15.9%)

Table I. General characteristics, risk factors and comorbidities

Parameter	All patients (*n* = 207)	Elective (*n* = 165)	ACS (*n* = 42)	*P*-value
Age, mean ± SD [years]	71 ±2	70 ±1	75 ±4	**< 0.001**
Previous ACS, *n* (%)	130 (63)	99 (60)	31 (74)	NS
Previous PCI, *n* (%)	152 (74)	128 (78)	24 (57)	< 0.01
Previous CABG, *n* (%)	31 (15)	26 (15)	6 (14)	NS
Heart failure, *n* (%)	70 (34)	50 (30)	20 (48)	**< 0.05**
LVEF, mean ± SD [%]	50 ±11	51 ±11	47 ±13	**< 0.05**
LVEF ≤ 35%, *n* (%)	34 (17)	22 (14)	12 (29)	**< 0.05**
Procedural data				
EuroScore II mortality rate, median (IQR)	2.4 (1.4–4.9)	2.1 (1.3–3.8)	5.15 (2.6–9.3)	**< 0.0001**
Syntax Score, median (IQR)	17 (11–24)	17 (11–24)	21.5 (15–29)	**< 0.05**
CABG inoperable, *n* (%)	116 (56)	86 (52)	30 (41)	**< 0.05**
Attempted PCI failure, *n* (%):				
Nondilatable lesion	105 (51)	86 (52)	19 (45)	NS
Uncrossable lesion	48 (23)	38 (23)	10 (24)	NS
Unknown	11 (5)	9 (6)	2 (5)	NS
Procedure success, *n* (%)	184 (89)	147 (89)	37 (88)	NS
Ad hoc procedure, *n* (%)	6 (4)	7 (4)	2 (5)	NS
Radial access, *n* (%)	125 (60)	99 (60)	26 (62)	NS
GP IIb/IIIa inhibitor, *n* (%)	5 (2)	5 (3)	0	NS
IABP, *n* (%)	4 (2)	2 (1)	2 (5)	NS
Outcomes				
CIN, *n* (%)	6 (3)	2 (1)	4 (10)	**< 0.05**
ARC major bleeding, *n* (%)	14 (7)	8 (5)	6 (14)	**< 0.05**
In-hospital mortality, *n* (%)	2 (1)	0	2 (5)	**< 0.05**
In-hospital stroke/TIA, *n* (%)	1 (0.5)	1 (1)	0	NS
In-hospital MI, *n* (%)	28 (14)	22 (13)	6 (14)	NS
In-hospital TVR, *n* (%)	1 (0.5)	0	1 (2)	NS
Total 1-year mortality, *n* (%)	20 (10)	14 (8)	6 (14)	NS
1-year MI, *n* (%)	20 (8)	15 (9)	5 (12)	NS
1-year ADHF, *n* (%)	12 (6)	9 (5)	3 (7)	NS
1-year stroke/TIA, *n* (%)	2 (1)	2 (1)	0	NS
Predictors of 1-year mortality (*n* = 207)				
Parameter		**HR**	**95% CI**	***P*-value**
LVEF (%)		0.95	0.91–0.99	< 0.05
PCI failure: uncrossable lesion		4.00	1.57–10.20	< 0.01

Table I. Patient characteristics

Variables	Values
Study group	88
Mean age [years]	69 ±8.3
Sex, male	58 (66%)
Mean time between procedures [days]	94.4 ±84.4
Diabetes	31 (35.2%)
Mean EF	49.4%
Arterial hypertension	73 (83.0%)
Atrial fibrillation	8 (9.1%)
Recent MI	32 (36.4%)
PCI in history	31 (35.2%)
CABG in history	9 (10.2%)
PAD	67 (76.1%)
Stenotic carotid arteries	23 (26.1%)

deaths: 7 (7.9%) heart related, 4 (4.5%) cancer related, 3 (3.4%) others. In a multivariate analysis, the only independent factor of mortality was left ventricular ejection fraction (LVEF; OR = 0.93; 95 CI: 0.87–0.99; p = 0.02). Time between procedures was not a predictor of mortality and MI.

Conclusions: In patients with peripheral atherosclerosis requiring major vascular surgery after PCI with second generation DES implantation, early discontinuation of DAPT – on average 90 days after PCI is not associated with increased risk of death, MI, or major bleeding.

10-P

Gender-related differences in outcomes after percutaneous balloon aortic valvuloplasty

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Background: This study aimed to evaluate gender-related differences in short- and long-term outcomes of patients undergoing balloon aortic valvuloplasty (BAV) for severe aortic stenosis (AS).

Methods: Between October 2012 and July 2015, a cohort of 112 patients with severe aortic AS underwent 114 BAV procedures as palliative procedure, bridge to definitive treatment or before urgent non-cardiac surgery. Clinical and procedural characteristics, in-hospital outcomes and 2-year mortality data were collected. Kaplan-Meier curves for women and men were constructed and compared by the log-rank test. Multivariable Cox regression analysis was performed to identify the independent predictors of long-term mortality.

Results: Of the 112 patients, 62.5% (n = 70) were women. As compared with men, women were older, had higher STS score, higher prevalence of chronic kidney disease, arterial hypertension and lower aortic valve area (all p < 0.05). Indications for BAV did not differ by gender. Women had higher risk of vascular complications than man (15.7% vs. 0.0%, p = 0.007) however with similar major periprocedural complications rate (17.1% vs. 9.5%, p = 0.40). Transcatheter aortic valve implantation (TAVI) was performed in 22.8% (n = 16) women and 26.2% (n = 11) men, p = 0.61, surgical aortic valve replacement (AVR) in 10% (n = 7) women and 11.9% (n = 5) men, p = 0.70. Women and men treated with TAVI/AVR had lower mortality as compared with conservative treatment (p = 0.004). Peri-procedural, in-hospital and 24-month mortality before definitive treatment were comparable between women and men (2.9% vs. 2.4%, p = 1.00; 11.4% vs. 4.9%, p = 0.26; 63.3% vs. 39.0%, p = 0.22, respectively). Kaplan-Meier curves for survival stratified by gender are shown in Figure 1. In a multivariable Cox model, STS above 9.8 (HR = 2.29; 95% CI: 1.09–4.83, p = 0.028) was an independent predictor of all-cause mortality only in women.

Conclusions: Presence of significant gender-related differences in baseline characteristics, procedural data and risk of vascular complications were confirmed for patients with severe AS undergoing BAV. However, no

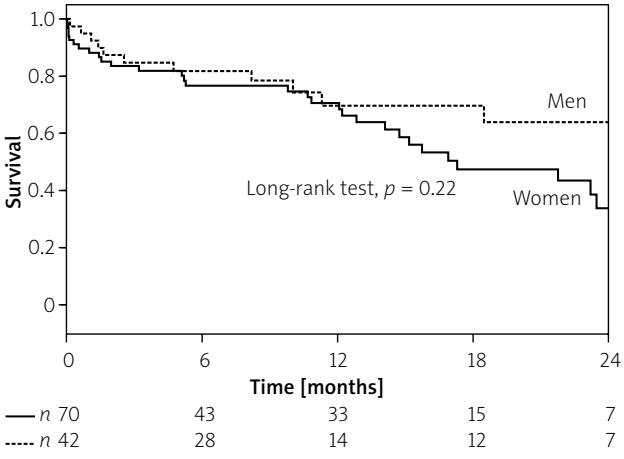

Figure 1. Kaplan-Meier curves for survival stratified by gender

difference in major procedural complications as well as long-term mortality between women and men was observed.

11-P

Transcatheter closure of patent foramen ovale for the secondary prevention of decompression illness in professional divers: a single centre experience with long-term follow-up

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Background: Patent foramen ovale (PFO) with occasional right-to-left shunt is associated with an increased risk of decompression illness (DCI). Divers with a history of repetitive or severe DCI and diagnosed PFO should be considered for the percutaneous closure of the defect if they wish to continue with unrestricted diving. In this study we aimed to summarise our experience in transcatheter PFO closure in professional divers with the history of DCI, based on a long-term follow-up of 11 divers treated in our centre.

Methods: A follow-up of 11 consecutive divers (9 males, 2 females) in whom percutaneous closure of PFO was performed between 2001–2015 for the secondary prevention of DCI was carried out by phone contact (Table I).

Results: The median follow-up at the time of the analysis was 91 (minimum 9, maximum 172) months. No complications of the procedure were observed in the investigated group. All patients returned to unrestricted, deep diving after the procedure, performing a total of 3,610 dives with the median number of 225 dives (lower quartile value: 82.5, upper quartile value: 72.5 dives). The majority of subjects dived as deep as they did before the intervention, or deeper, achieving mean maximum depth of 93.8 ±35.6 m (vs. 89.73 ±25.92 m before the intervention, p = 0.71). No episode of DCI was observed in the follow-up.

Conclusions: Percutaneous closure of PFO appears reasonably effective in secondary prevention of DCI associated with intra-cardiac shunt.

Table I. Characteristics of the investigated group

No.	Gender	Age [years]	Observation time [months]	Occluder implanted	Time from intervention to next diving [days]	Number of divings after intervention	Max. depth before intervention [m]	Max. depth after intervention [m]
1	Male	41	172	APFO 25	5	10,000*	70	160
2	Female	36	121	APFO 25	7	100	110	70
3	Male	35	115	APFO 25	270	300	55	60
4	Male	32	101	APFO 25	180	700	115	120
5	Male	44	99	CARDIA PFO 30	90	800	60	40
6	Female	35	91	APFO 25	365	30	100	70
7	Male	44	60	APFO 25	90	350	75	90
8	Male	40	60	APFO 25	120	150	80	102
9	Male	49	58	APFO 25	30	1,000	140	140
10	Male	30	40	APFO 25	120	150	80	100
11	Male	47	9	APFO 25	180	30	102	80

**Saturation diving technique: total time (hours) from compression to complete decompression.*

12-P

Predictors of the blood pressure improvement in patients with renal artery stenosis referred to renal artery stenting

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Background: In the light of randomized trials, renal artery stenting (PTA) seems to have questionable effect on clinical outcome. However, smaller observational studies indicated that still there might be a field for intervention in the selected subset of subjects. Therefore, the present study aimed to investigate what features distinguish subjects who improved in terms of the systolic blood pressure (SBP) reduction after PTA from those who did not benefit.

Methods: Study enrolled 118 (57 male, 63.9 ±8.8 years) consecutive patients referred to PTA for ill-controlled hypertension. Blood pressure control was obtained using 24-hour ambulatory blood pressure monitoring (ABPM), with assessment of the mean SBP and diastolic blood pressure (DBP), the loads of SBP and DBP in patients on antihypertensive drugs, before PTA and 12 months after PTA. Study group was divided retrospectively with regard to achieved SBP control. Subjects in whom SBP decreased by at least 20 mm Hg during 12 month FU after PTA were comprised in group I: 25 (21%) patients. Group II comprised 93 (79%) subjects in whom SBP reduction was lower than 20 mm Hg or deteriorated.

Results: Analysis showed that group I vs. group II patients had higher renal artery stenosis (RAS) degree (75.2 ±14.7% vs. 66.7 ±10.5%, $p = 0.001$). The initial SBP, DBP, SBP load and DBP load were significantly higher in group I vs. group II subjects (154.8 ±16.7 mm Hg vs. 130.6 ±16.4 mm Hg, $p < 0.001$; 86.1 ±11.7 mm Hg vs. 72.7 ±8.8 mm Hg, $p < 0.001$; 77.9 ±18.7 mm Hg vs. 40 ±28.2 mm Hg, $p < 0.001$, and 50 ±26.4 mm Hg vs. 21 ±18.5 mm Hg, $p < 0.001$, respectively). The mean number of blood pressure lowering agents was similar in group I and group II subjects, both before (3.44 ±1.3 vs. 3.26 ±1.1, $p = 0.479$) and 12 months following PTA (3.12 ±1.4 vs. 2.95 ±1.2, $p = 0.541$). This may indicate that the effect of blood pressure (BP) values decrease was associated rather with PTA, than drug regiments. On backward logistic multivariable analysis, independent predictors of significant blood pressure reduction after the PTA were: higher RAS degree (OR = 1.24, 95% CI: 1.07–1.44; $p = 0.006$), higher initial SBP (OR = 1.27, 95% CI: 1.03–1.56; $p = 0.026$), higher initial DBP load (OR = 1.33, 95% CI: 1.09–1.64; $p = 0.007$) and bilateral RAS or RAS of single functioning kidney (OR = 1.16, 95% CI: 1.00–1.36; $p = 0.053$).

Conclusions: Among patients after PTA, about 20% are high responders with regard to blood pressure control. Positive effect following PTA of RAS can be expected in patients with higher initial SBP and DBP parameters, with high-grade RAS and subjects with bilateral RAS or RAS of single functioning kidney. Our results indicate that PTA of RAS is justified in carefully selected patients.

13-P

Clinical outcome, long-term survival and prognostic factors of cardiovascular events in patients treated with percutaneous angioplasty for renal artery stenosis

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Background: Studies indicate that patients with renal artery stenosis (RAS) are at high risk of cardiovascular events (CVE), e.g. myocardial infarction (MI), stroke (IS), and cardiovascular death (CVD). However, the impact of renal artery stenting (PTA) in subjects with RAS on the long-term prognosis and factors associated with this unfavorable prognosis are still debated. The present study aimed to evaluate impact of PTA on renal function, blood pressure and survival in patients treated with PTA for RAS, as well as to identify independent risk factors of CVE in long-term follow-up.

Methods: Two-hundred-and-forty renal artery angioplasty procedures were performed in 208 consecutive subjects (113 male, mean age: 64.5 ±11.9 years) for the mean RAS degree of 70.3 ±13.4% between June 1997 and December 2015. The immediate and long term outcome of PTA was assessed with regard to renal function, blood

pressure values and incidence of restenosis. Prevalence of CVE, including CVD, MI, and IS were recorded prospectively. The potential prognostic risk factors of CVD/MI/IS were analyzed.

Results: The procedural success was 239/240 procedures. Mean creatinine level decreased from pre-PTA: 133 ±62 to 116 ±55.9 µmol/l at 6 month, and to 117 ±58.6 µmol/l at 12 months after PTA (p = 0.003). Systolic blood pressure changed from 142 ±21.8 mm Hg before PTA to 130 ±15.9 mm Hg, at 6 month, and to 130 ±15 mm Hg at 12 month (p < 0.001), while diastolic blood pressure from 78 ±12.3 to 74 ±9.2 mm Hg, and to 73.7 ±9.5 mm Hg (p < 0.001) respectively. The mean number of blood lowering agents was reduced from 3.33 ±1.2 before PTA to 3.06 ±1.3 at 12 month following PTA (p = 0.003). Restenosis occurred in 24/207 (11.6%) patients and it was treated with repeated PTA. Factors associated with restenosis were: hyperlipidemia (OR = 1.23, 95% CI: 1.06–1.42, p = 0.005) and diabetes (OR = 1.15, 95% CI: 1.0–1.33, p = 0.055). During the mean follow-up period of 62.1 ±37 (range: 1–213) months, CVE occurred in 54 (26%) patients (24 CVDs, 17 non-fatal MIs, 13 non-fatal ISs). Initial serum creatinine (OR = 1.25; 95% CI: 1.04–1.51, p = 0.02) and creatinine at 12 month (OR = 1.18; 95% CI: 1.03–1.35, p = 0.015), concomitant coronary artery disease (OR = 1.19; 95% CI: 1.04–1.36, p = 0.011), and SBP at 12 months after PTA (OR = 1.16; 95% CI: 1.02–1.33, p = 0.025) were independently associated with CVD/MI/IS risk.

Conclusions: PTA of RAS resulted in significant reduction of creatinine level, blood pressure values and the number of blood lowering agents. During mean 5-year period following PTA of RAS, the CVE rate was 26%. Factors independently associated with CVE risk were pre procedural and 12 month levels of serum creatinine, SBP at 12 months following PTA and concomitant coronary artery disease. Restenosis occurred in 11.6% and it was associated with hyperlipidemia and diabetes.

14-P

Hybrid or staged carotid artery stenting and open-heart surgery as the treatment strategy for patients with severe, concurrent carotid and cardiac disease

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Aim: To evaluate the role of carotid artery stenting (CAS) performed according to the 'tailored' algorithm in the revascularization of severe internal carotid artery (ICA) stenosis in patients requiring (urgent or elective) cardiac surgery.

Methods: From 2009 to 2015, 100 patients (69.2 ± 6.7 years, range: 53–84 years; 77% male) underwent CAS combined with cardiac surgery: coronary artery bypass grafting (CABG) and/or valve surgery (Table I). The decision on the type and timing of the procedures was made individually in the vascular heart team. Patients with non-ST elevation myocardial infarction (NSTEMI)/unstable angina/NYHA III–IV had a hybrid procedure (HP): CAS simultaneous with cardiac surgery. Those with severe, but stable cardiac disease had staged procedure (SP): CAS in

Table I. Patient and procedure characteristics

Parameter	HP (N = 58)	SP (N = 42)	P-value
Age [years]	70.2 ±6.6, range: 53–83	67.9 ±6.8, range: 55–84	0.09
Ipsilateral stroke/TIA	17 (29%)	22 (52%)	0.13
ICA stenosis (%)	85.3 ±9.7; 60–99	85.3 ±8.1; 60–99	1.0
Proximal neuroprotection device	28 (48.3%)	21 (50%)	1.0
Closed-cell/mesh-covered stent	55 (95%)	37 (88%)	0.88
Left main stenosis	21 (36%)	12 (28.6%)	1.0
EuroSCORE II	2.74 ±1.39; 0.95–6.91	1.98 ±1.08; 0.85–4.95	0.004
Isolated CABG	52 (89.6%)	36 (86%)	0.88
Isolated valve surgery or CABG + other procedure*	6 (10.3%)	6 (12.5%)	0.75

**Valve/aortic surgery/left ventricle aneurysmectomy/ left atrial appendage closure.*

the first step and cardiac surgery ≥ 5 weeks later. Carotid artery stenting was done according to the 'tailored' strategy – to fit proper neuroprotection (proximal or distal) and stent type (open, closed-cell or mesh-covered) to the ICA stenosis severity and neurological symptoms. In the HP group CAS was performed on acetylsalicylic acid and unfractionated heparin; loading dose of clopidogrel (300 mg) was given in ≥ 6th postoperative hour, if major bleedings were excluded. Patients in SP group had dual antiplatelet therapy for a month, clopidogrel was withdrawn 5–7 days before cardiac surgery.

Results: No major neurological in hospital or 30-day complications were noted. In the early postoperative period 1 myocardial infarction and 2 deaths as a result of multi-organ failure (3; 5.2%) occurred in the HP group and 1 (2.4%) death due to cardiogenic shock in SP group; $p = 0.6$.

Conclusions: Carotid artery stenting performed according to the 'tailored' algorithm prior to cardiac surgery is a low risk procedure and might be an option to prevent possible perioperative neurological complications of ICA stenosis. Patients requiring urgent cardiac surgery have slightly increased risk of the procedure.

15-P

Impact of carotid artery revascularization on the cognitive, functional outcome and cerebral flow in patients with symptomatic carotid artery stenosis

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Background: About 30% of patients with carotid artery stenosis (CAS) develop dementia after cerebral ischemic event (CIE), and 20–50% suffer from CIE recurrence during 6 months. Carotid artery revascularization (CAR) may prevent CIE recurrence, at the cost of new micro-embolic lesions (MES). The impact of CAR on cognitive function is debatable. The aim was to assess either functional and cognitive outcome, cerebral flow on transcranial Doppler (TCD) and brain magnetic resonance imaging (MRI) in patients with symptomatic CAS referred to CAR.

Methods: Fifteen patients (aged 68 ±8.2 years old, 9 male) with recent CIE (17.6 ±10.2 days to CAR) related to CAS of mean 88.9 ±3.9% lumen reduction were prospectively with TCD, diffusion and perfusion MRI, Montreal Cognitive Assessment (MoCA), Mini Mental State Examination (MMSE), modified Rankin Scale (mRs) and National Institutes of Health Stroke Scale (NIHSS) 24 h before, at 48–72 h and 1 month following CAR.

Results: New MES were found in 7 (46.7%) subjects following CAR. Carotid artery revascularization resulted in significant increase of cerebral flow velocity in middle and anterior cerebral arteries ($p < 0.001$ and $p = 0.009$; respectively) and cerebral perfusion measured by TTP and MTT ($p = 0.005$ and $p = 0.002$; respectively). Neurologic tests showed improvement in NIHSS (3.1 ±1.1 to 1.9 ±1.2; $p = 0.003$), mRs (from 1.6 ±0.8 to 0.9 ±0.9, $p = 0.008$), and MMSE (26.4 ±2.4 to 27.8 ±2.3; $p = 0.012$) at 1 month. Montreal Cognitive Assessment scores before and 1 month after CAR remained similar (22.8 ±3.6 vs. 23.4 ±3.3; $p = 0.752$).

Conclusions: Improvement of cerebral flow and perfusion, functional outcome, as well as no cognitive decline are observed after CAR for symptomatic CAS.

16-P

Very early same-day discharge after planned percutaneous coronary interventions utilizing vascular closure devices

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Background: Very early discharge after percutaneous coronary interventions (PCI) is now possible vascular closure devices (VCDs) when using the femoral access.

Methods: We retrospectively analyzed 261 consecutive procedures performed from femoral access with a VCD in a single center between January 2008 and December 2013. The primary endpoint was access site complication rate. The secondary endpoint was time from end of procedure to discharge.

Results: The complication rate was 2.68% (7/261). The following complications occurred: 3 hematomas, 1 pseudoaneurysm requiring treatment and 3 device failures. Mean time to discharge was 4 h 1 min (range: 2 h 19 min to 6 h 48 min).

Conclusions: Utilization of VCDs allows for safe and early same-day discharge of patients undergoing planned PCI procedures.

17-P

Long-term outcomes of same-day discharged patients after percutaneous coronary intervention in stand-alone centers

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Background: Previous studies of same-day discharge after percutaneous coronary intervention (PCI) demonstrated favorable short term outcomes. There are limited data evaluated the long term results, especially for unselected population.

Methods: We retrospectively studied and followed up for 12 months 396 consecutive patients undergoing planned PCI with same-day discharge between December 2007 and May 2015 in two stand-alone centers.

Results: The mean age of the study population was 56.6 ±7.59 years (males 77.22%). 10.1% of the lesions were on bifurcation, 4.29% were CTO, 5.3% were in a bypass graft and 1.26% were in protected LM. Procedural success occurred in 96.21%. Groin access was used in 83.08% with VCD in 93.01% of procedures. Access site complications (uncomplicated VCD failure, hematoma, small dissection, pseudoaneurysm, spasms of radial) occurred in 1.77% of cases. Only 1 patient required hospitalization due to anaphylactic drug reaction in a peri-procedural period. The mean time from procedure end to discharge was 3 h 59 min. No death or major bleeding occurred during 30-day observation. Two patients had early stent thrombosis with MI, 1 patient was re-admitted for repeat angiography without intervention, 1 had TVR and one patient had stroke. At 12 months there were 15 ISR required angioplasty or CABG and 28 TVR. One patient had stroke and one had transient ischemic attack. Seven patients had MI at 12 months (1.77%). One patient died due to non-cardiac reasons.

Conclusions: Our study shows excellent long term safety outcomes for unselected population of patients undergoing elective PCI in stand-alone centers without overnight stay.

18-P

Safety and efficacy of Hematrix patch for femoral artery closure after cathlab procedures

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Background: We aimed to evaluate safety and efficacy of hemostatic polyurethane matrix (Hematrix) for femoral artery access site closure.

Methods and results: In a series of 31 patients two sizes of Hematrix patch were used: 10 × 10 cm (body mass index > 30 kg/m^2 or thick layer of fat at puncture site) or 5 × 5 cm. The arterial sheath (6 F in all cases) was removed directly after the procedure and then the access site was manually compressed for 10 min. In patients who had PCI (and heparin administered) a compression band was placed for 6 h. In the remaining cases no compression band was used, and the access site was checked for hematoma or bleeding during the first 6 h. Hemostasis was obtained in all patients. The blood flow in femoral artery (evaluated by ultrasound examination) was normal in all cases. Only one serious complication was seen – a pseudoaneurysm of femoral artery access site – probably due to administration of low molecular weight heparin 48 h after the procedure. Two cases of mild complications (6% of the group) were seen: superficial hematomas that required prolonged compression by pressure band.

Conclusions: The Hematrix patch appears to be efficient in closing femoral artery access site after cornarography or PCI. It offers similar advantages and has equally low incidence of complications as currently available mechanical closure devices (sheath removed directly after the procedure, short bed rest or compression time). It is distinguished from them by much lower price and requires less training.